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The Journal of School Nursing 2008 24: 95

DOI: 10.1177/10598405080240020801

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Family Perceptions of Medication Administration at School: Errors, Risk Factors, and Consequences

Daniel Clay, PhD; Karen Farris, PhD; Ann Marie McCarthy, RN, PhD, PNP; Michael W. Kelly, PharmD; and Robyn Howarth, MA

ABSTRACT: Medications are administered every day in schools across the country. Researchers and clinicians have studied school nurses' and educators' experiences with medication administration, but not the experiences of children or their parents. This study examined medication administration from the child and parent perspectives to (a) determine problems children experience with medicines at school, (b) clarify risk factors for medication errors, and (c) examine the perceived impact of medication errors on school performance and social relationships. Participants included children ages 8 to 18 years ($n = 157$) being treated at a large Midwestern Children's Hospital in diabetes, asthma, and Attention Deficit Hyperactivity Disorder (ADHD) clinics. Findings suggest that forgetting a dose and running out of medication were the most common problems. Missing a dose was more frequent in students with ADHD than in students with diabetes or asthma. Medication nonadherence at school, which includes medication administration errors such as missing a dose, may potentially lead to a variety of educational, social/emotional, and physical consequences. These results indicate that the impact of missing medication on children with ADHD appeared to have a greater effect on schoolwork and friendships, while the physical consequences appeared to vary widely based on health condition. Interestingly, children with more self-responsibility for medications were less likely to report medication errors. School nurses will want to include students when planning for medication management at school.

KEY WORDS: medication errors, nonadherence, school health, school problems

OVERVIEW

Children with complicated health problems often require specific health care regimens that include the administration of medications. An estimated 10–20% of children have a chronic health condition, with a

significant proportion of these children having a severe condition (Clay, 2004; Wallander, Thompson, & Arliksson-Schmidt, 2003). The administration of medications for such conditions as asthma and diabetes are commonplace in the school setting, and children with chronic health concerns are now found in nearly every classroom. Likewise, an increase in emotional and behavioral problems in school-age children in the past two decades, particularly Attention Deficit Hyperactivity Disorder (ADHD) (Meaux, Hester, Smith, & Shop-taw, 2006; Zito et al., 2003), has resulted in an increase in the number of children treated with stimulant medication. Clay, Cortina, Harper, Cocco, and Drotar (2004) found that nearly every teacher surveyed in their study ($n = 480$) knew at least one student in their school with a chronic illness, and many reported currently having children with a chronic illness in their

Daniel Clay, PhD, is a professor and associate dean, College of Pharmacy, Auburn University, Auburn, AL.

Karen Farris, PhD, is an associate professor, College of Pharmacy, The University of Iowa, Iowa City, IA.

Ann Marie McCarthy, RN, PhD, PNP, is a professor and chair of the department of parent, child, and family nursing, The University of Iowa, Iowa City, IA.

Michael W. Kelly, PharmD, is an associate professor and associate dean, The University of Iowa, Iowa City, IA.

Robyn Howarth, MA, is a PhD student in the College of Education, The University of Iowa, Iowa City, IA.

classroom. An estimated 4–6% of all school-age children receive medication in school on a typical day (Ficca & Welk, 2006; McCarthy, Kelly, & Reed, 2000). In a recent study, the introduction of long-acting stimulants for ADHD led to the number of doses administered in schools decreasing between 2000 and 2003, while the range of medications administered increased (McCarthy, Kelly, Johnson, Roman, & Zimmerman, 2006).

Adherence to medication regimens has received considerable attention in the medical and psychological literature given its central role in predicting morbidity and mortality in children with chronic illness. Research on short-term medication regimens lasting only 10 days has revealed rates of nonadherence of over 50% (Rapoff, 1999). Nilaward, Mason, and Newton (2005) reported that rates of adherence may range from 7% to 89% for short-term and 11% to 83% for long-term regimens. Medication nonadherence has been linked to a wide array of poor medical, social, and educational outcomes such as organ rejection, death, disease progression, decreased cost-effectiveness of health care, lower quality of life, peer rejection, school absences, and school failure (Rapoff). Deviations from prescribed medication regimens may be costly from both therapeutic and economical perspectives (Farris, McCarthy, Kelly, Clay, & Gross, 2003).

Difficulties in accurately administering medications to children occurs both at home and at school. Reutzel and Patel (2001) evaluated activity on a school nurse listserv over a 5-month period and identified 71 threads that dealt with issues regarding medication administration problems and attempts to address them. However, research on adherence to medications in schools is limited, which is problematic given the high percentage of school children currently receiving medications in school on a daily basis.

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One method of exploring adherence to treatment regimens is to examine errors in medication administration in the schools. Considering the complexity involved in administering medications in schools, it is expected that some errors will occur. In one study (McCarthy et al., 2000), 48.5% of surveyed school nurses from across the country reported errors occurring in medication administration in the last year. Missed dose (79.7%) was the most common error, followed by no documentation of administration (29.8%), overdose or double dose (22.9%), and incor-

rect medication (20.0%). Likewise, Farris and colleagues (2003) found that more than two thirds of school principals surveyed reported that one or more missed doses per month occurred due to medications not being supplied to school officials. Sixty percent of respondents indicated that one or more missed doses occurred due to students not reporting when called to the office to take medications, while 38% claimed that one or more doses per month were missed due to staff error. In a Pennsylvania study (Ficca & Welk, 2006), 31% reported medication errors in the last year, with missed doses the most common error, followed by no documentation of administration, overdose or double dose, and medication administered to the wrong child. In an audit of school nurse medication administration records (Canham et al., 2007), medication errors identified included transcription errors, incorrect dosage, missed doses, expired dates, and inappropriate storage.

Personnel with little or no training in medication administration are frequently responsible for administering medications in schools (Brener et al., 2000; Francis, Hemmat, Treolar, & Yarandi, 1996; McCarthy et al., 2000). For example, Price, Dake, Murnan, and Telljohann (2003) surveyed 385 elementary school secretaries and found that 69% reported administering medication and 63% administered medications 5 days per week. Of those administering medications, 25% reported receiving no training, and of those who did receive training, 52% reported receiving 2 hours or less of training. While some research suggests that administration by unlicensed assistive personnel (UAP) can result in increased medication errors (Farris et al., 2003; McCarthy et al., 2000), 85% of the secretaries in the study by Price and colleagues reported making no errors in the past year. These self-report data are inconsistent with previous research and may not reflect the actual number of errors that occur when medications are administered by UAP due to a lack of willingness to admit such errors or lack of knowledge that an error even occurred. Consequently, data from medication recipients are needed to further understand the extent to which medication administration errors occur.

Numerous risk factors that contribute to errors in medication administration in school have been identified in the literature. Rapoff (1999) found several variables correlated with nonadherence typically examined in clinical settings such as disease duration, age of child, adjustment and coping of child and family, and complexity of treatment regimens. McCarthy and colleagues (2000) identified potential risk factors for errors in school medication administration including the lack of a school nurse, as well as the level of a child's self-responsibility for carrying, storing, and administering medication. However, to date the risk factors for medication errors in schools have not been

systematically examined to determine the link to patient-reported nonadherence, medication administration errors, or the perceived social and educational consequences.

The purpose of this study was to examine problems with medication administration in the school by (a) determining the types of problems and mistakes children experience with their medicines at school, (b) clarifying risk factors for nonadherence to medication regimens at school, and (c) examining child and parent-reported impact of medication errors on school performance and social relationships. While research on medication administration in schools has typically been from the school staff's perspective, this study obtained child and parent perspectives on medication administration in schools.

METHODS

Children with specific chronic health conditions, including ADHD, asthma, and diabetes, and their parents were invited to participate in this study. Participants diagnosed with these conditions were chosen because they are common health conditions that typically require the administration of medication in the school setting. Families with children between the ages of 8 and 18 years followed at a large Midwestern children's hospital participated. Consecutive families were approached and asked to participate during routine clinic appointments. Following approval by the Institutional Review Board, parents signed consent forms and children signed assent forms prior to enrollment in the study.

A letter of introduction and explanation of the project from the attending physician in each clinic was sent to families meeting the inclusion criteria one week before their scheduled clinic appointment. When families arrived at the clinic, a clinic staff member asked if the family was interested in participating in the study. If they were interested, a research assistant (RA) approached the family to explain the study and obtain parent consent and child assent. While parents completed their questionnaire, the RA interviewed the child in a private area of the clinic away from the parents. The RAs were graduate or professional students from the Colleges of Education, Pharmacy, or Nursing who were trained and supervised by the co-investigators. Families were compensated for their time with a \$10 gift certificate to a local mall.

Measures

A semistructured interview entitled *Child/Parent Perceptions of Medication Administration in the School Setting* was developed for use in this study. Initial development of the survey was based on the clinical and research experience of the study authors, a review of rec-

ommended guidelines (American Academy of Pediatrics, 2003; National Association of School Nurses [NASN], 2003) and a survey used in a previous study of medication administration in the schools (McCarthy et al., 2000). Interview questions were added that focused specifically on missed doses at school because previous research demonstrated this was the most common medication error (Ficca & Welk, 2006; McCarthy et al., 2000). Additional evidence of content validity of the measure was obtained using a combination of an expert panel and pilot testing. The expert panel consisted of both nurses and physicians from each of the three specialty clinics (diabetes, asthma, and ADHD), local school nurses, a school nurse consultant, and the co-investigators. Once the survey was developed, it was piloted with five families from the targeted clinics, and revisions were made based on parents' and children's comments. A copy of the interview is available from the authors upon request.

RESULTS

The final sample (*n* = 157) included 75 parent-child dyads with diabetes, 37 with ADHD, and 45 with asthma. Summary statistics of demographic variables are found in Table 1. Bringing medicines to school, and storing and administering them to children were found to vary by illness group. For example, a higher percentage of children with asthma indicated they keep medicine in their own bag compared with children with ADHD or diabetes, who tend to store medicine in the nurse's office. Children with asthma and diabetes reported a greater frequency of self-administering their medicines than those with ADHD, who were more likely to have medications administered by the school nurse. Anywhere from almost two thirds to 86% of children in the clinics reported that they remembered on their own to take their medicine at school. Child and parent responses pertaining to transporting, storing, and taking medicines at school are presented in Table 2.

Table 1. Demographic Variables for Child Participants

	Diabetes	ADHD	Asthma	Total
Gender (<i>n</i> , %)				
Male	44 (59)	29 (81)	25 (57)	98 (63)
Female	31 (41)	7 (19)	19 (43)	57 (37)
Missing	0	1	1	2
Total	75	37	45	157
Grade (<i>n</i> , %)				
K-3	8 (11)	10 (27)	5 (11)	23 (15)
4-6	19 (25)	18 (49)	17 (38)	54 (34)
7-8	17 (23)	7 (19)	11 (24)	35 (23)
9-12	31 (41)	2 (5)	12 (27)	45 (29)
Age				
Mean	13.3	10.8	12.8	12.6
SD	(2.8)	(2.4)	(2.6)	(2.8)

Table 2. Child and Parent Reports of Transporting, Storing, and Taking Medicines at School

	ADHD % (<i>n</i> = 33)		Asthma % (<i>n</i> = 44)		Diabetes % (<i>n</i> = 72)	
	Child	Parent	Child	Parent	Child	Parent
Have school nurse						
Yes	90.6	89.7	90.9	85.7	87.5	91.4
Getting medicines to school						
Parent	33.3	21.1	20.5	30.2	26.8	30.6
Self	63.6	55.3	38.6	27.9	63.4	55.6
Other	6.1	42.1	50.0	58.1	15.5	34.7
Store medicines at school ^a						
Nurse's office	69.7	73.0	41.9	50.0	62.5	68.1
Secretary/teacher's office/desk	27.3	29.7	16.3	26.2	16.7	18.1
Keep in own bag	3.0	2.7	60.5	40.5	15.3	8.3
Other	6.1	2.7	9.3	14.3	9.7	18.1
Cue to take medicines ^b						
Teacher reminds	27.3	—	0	—	6.9	—
I go myself	75.8	—	63.8	—	86.1	—
Someone gets me	6.1	—	2.3	—	1.4	—
Other	3.0	—	39.5	—	8.3	—
Who gives medicine to you						
Nurse	60.6	60.5	31.8	42.9	18.1	28.1
Teacher/secretary	42.4	50.0	20.5	33.3	5.6	11.1
No one; I give to myself	3.0	2.6	56.8	47.6	76.4	61.1
Other	0	7.9	13.6	19.0	8.3	11.1
Who watches you take medicine ^b						
Person who gives it to me	96.9	—	46.5	—	40.9	—
Another person	0	—	0	—	9.9	—
No one	3.1	—	53.5	—	49.3	—
Problems with medicines at school ^b						
Yes	50.0	—	25.0	—	15.3	—

Note. Summing responses may exceed 100% because more than one response per item could be checked.

^a May exceed 100% if stored in more than one place.

^b Item not specifically addressed in parent questionnaires.

Fifty percent of children taking ADHD medicines reported problems with taking medicines at school, along with 25% of children with asthma and 15.3% of children with diabetes.

Errors with Medication Administration

The percentage of children reporting a problem with their medicines at school also varied by health condition. Fifty percent of children taking ADHD medicines reported problems with taking medicines at school, along with 25% of children with asthma and 15.3% of children with diabetes. These problems included trouble remembering to take medicine, side effects, feelings of embarrassment and anger, and being teased by other students for having to take the medication. Twenty-eight percent of children in the study indicated that a mistake had occurred in taking medicine at school. More specifically, two thirds of children with ADHD, 18% of children with asthma, and 17% of children with diabetes revealed mistakes with

their medicines at school. The most common errors reported included forgetting to take medications and running out of medication.

Risk Factors for Medication Errors

To examine the risk factors associated with medication errors, a new variable was created that combined risk factors identified in the literature with the collective clinical experiences of the authors. Five items reflecting risk variables were coded (1 = yes, 0 = no) and summed to provide a risk factor score ranging from 0 to 5, with a higher number reflecting more child self-responsibility and therefore greater risk for medication errors. The items were: (a) child transports own medication to school; (b) child stores own medication in locker, desk, or bag; (c) child goes to nurse's office to take medicine; (d) child self-administers medication; and (e) child self-administers medication without supervision.

Based on the self-report measures, the mean risk factor scores were 2.9 for students with diabetes (*SD* = 1.1), 2.7 for students with asthma (*SD* = 1.2), and 1.4 for students with ADHD (*SD* = 0.7). Comparison of means revealed that children with ADHD had a sig-

Table 3. Child and Parent Perceptions of the Impact of Missing Medicines at School

	ADHD % (<i>n</i> = 33)		Asthma % (<i>n</i> = 44)		Diabetes % (<i>n</i> = 72)	
	Child	Parent	Child	Parent	Child	Parent
Frequency of missing medicine at school						
Never	45.4	—	65.9	—	81.9	—
Once per year	12.1	—	6.8	—	12.5	—
Once per month to < once per week	27.2	—	25.0	—	4.2	—
Once per week	12.1	—	2.3	—	0	—
Affects schoolwork						
Not at all	27.3	0	59.1	30.0	44.4	6.5
A little	15.1	14.3	15.9	12.5	13.9	10.9
Some	12.1	28.6	4.5	10.0	5.6	19.6
A lot	15.1	51.4	6.8	35.0	11.1	45.7
Not sure	6.1	5.7	4.5	12.5	6.9	17.4
Affects friendships						
Not at all	54.5	11.4	84.1	48.8	72.2	37.8
A little	18.2	28.6	6.8	12.2	4.2	13.3
Some	6.1	34.3	0	4.9	1.4	20.0
A lot	0	5.7	0	9.8	1.4	4.4
Not sure	0	20.0	4.5	24.4	4.2	24.4
Effect on physical health						
Nausea/vomiting/stomach cramps	3.0	0	6.8	4.9	24.6	25.6
Breathing problems	0	0	36.4	68.3	2.8	0
High blood sugar	0	0	0	0	36.1	69.8
Headache/dizzy/blurred vision	12.1	5.9	20.5	22.0	29.2	46.5
Lack of energy	3.0	0	11.4	14.6	12.5	18.6
Feel anxious	12.1	8.8	2.3	17.1	6.9	9.3
Feel confused	15.2	8.8	2.3	2.4	4.2	16.3
Unable to concentrate	36.4	73.5	15.9	26.8	8.3	30.2
Other	30.0	0	15.9	7.3	2.8	23.3
Effect on schoolwork						
Have trouble paying attention	39.4	91.2	6.8	19.5	18.1	23.3
Misbehave in class	27.3	50.0	2.3	4.9	4.2	11.6
Do poorly on an exam	18.2	55.9	2.3	7.3	12.5	14.0
No effect	0	2.9	29.5	17.1	31.9	0

nificantly lower risk factor score than both children with diabetes and asthma ($p < .0001$). Furthermore, correlations suggested that higher risk scores (i.e., increased child responsibility for medication administration) were associated with lower self-reported medication errors. Children with diabetes and asthma, the groups demonstrating more self-responsibility and thus greater risk for treatment nonadherence, reported fewer total errors with medication administration in school (15.3% and 25% respectively), compared with half of the students with ADHD reporting problems with taking their medication. Therefore, despite having less risk for errors in treatment adherence, children with ADHD appear less likely to remember to take their medication, leading to more errors. Risk scores were not associated with the presence of a school nurse ($p = .27$) but were correlated with the child's age (spearman $r = .57$, $p < .0001$).

Factors that might contribute to errors in medication administration in school were also explored. Approximately 30% of children with ADHD reported having trouble remembering when to take their medicine, while this was not the case among asthma and

diabetes samples. Similarly, about 20% reported being teased by others and 13% experienced physical side effects due to their medication. For children with asthma, the most frequently occurring contributors were remembering when to take medication (9%), feeling embarrassed (6%), and experiencing side effects (6%), while participants with diabetes most frequently reported "other" contributors (7%) and feeling angry about having to take the medication (4%). Based on these results, the factors leading to nonadherence differ for each of the three conditions.

Impact and Consequences of Medication Nonadherence

Nonadherence to medication treatment regimens may potentially lead to a variety of educational, social/emotional, and physical consequences. The outcomes associated with missing a dose of medication at school, as perceived by these families, were also examined and results are presented in Table 3. Parents consistently reported greater perceived concerns about the consequences of medication errors than did their

children for physical, academic, and social consequences.

Children from the diabetes clinic reported the highest frequency of never missing medicine at school, while 12.1% of participants with ADHD claimed to miss their medication once per week. Missing a dose of medicine at school does not appear to significantly impact friendships and interpersonal interactions for the three illness groups. However, approximately one fifth of children with ADHD reported that friendships were affected “a little” compared with 6.8% and 4.2% of children in the asthma and diabetes groups, respectively. Similarly, schoolwork was most affected for children with ADHD, perhaps due to frequent reports of difficulty paying attention, misbehaving in class, and performing poorly on assignments. On the other hand, a majority of children with asthma and diabetes reported little to no impact on schoolwork when they missed a dose of their medication.

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Missing a dose of medication may also lead to effects on a child's physical health. The most commonly reported physical complaints for children with diabetes included high blood sugar, headaches, blurred vision, stomach cramps, and feeling nauseous. For children with asthma, the primary complaint was problems breathing, followed by headaches, dizziness, and blurred vision. Conversely, the inability to concentrate was reported with greater frequency for children with ADHD. Children reported that missing medicines in school produced “no effects” on educational, social/emotional, and physical health for approximately one third of diabetes and asthma participants. However, all participants with ADHD indicated some effect within these domains of functioning.

DISCUSSION

Child and parent experiences with medication administration at school were explored among children with ADHD, asthma, and diabetes. More specifically, risk factors contributing to errors in medication administration at school and outcomes were examined within. The risk potential of making mistakes with medicines was determined by the manner in which medication was transported to, stored, and adminis-

tered in the school setting as well as the degree of supervision required.

Comparison of risk factor score means (child self-responsibility) revealed that children with ADHD had a significantly lower risk for nonadherence than both diabetes and asthma samples. Children with ADHD were afforded less responsibility for their own medication, which one would expect given the nature of ADHD. Greater child responsibility for proper administration of medication in the school setting was initially hypothesized to result in a higher incidence of problems and errors. However, the opposite was found in this study. More problems and mistakes were found among children with ADHD who had the least amount of responsibility for treatment adherence, while those with diabetes and asthma reported fewer errors related to their medication at school. Likewise, higher risk scores (i.e., more child responsibility) for asthma and diabetes groups were associated with lower self-reported nonadherence. These results are interesting, as they suggest that when students share responsibility for their medication management, such as children carrying their inhalers at school and self-administering when appropriate, fewer medication errors occur. This supports recent initiatives that recommend allowing students to carry inhalers and self-administer when needed, if they demonstrate the necessary skills (American Academy of Pediatrics, 2003; NASN, 2005). More research is needed to examine the role of students and school nurses in self-management in school and health outcomes.

In the school setting, all three groups reported being responsible for knowing when to take their medication during the day. Nevertheless, 27.1% of children with ADHD stated that they are reminded by their teachers, while 39.5% of children with asthma referenced “other” cues for medication administration. Children with asthma and diabetes appear to be more responsible for self-administering their medicines without supervision, while students with ADHD are most likely to rely on a nurse, secretary, or teacher to obtain and oversee the administration of their medication. The percentage of participants reporting a problem with their medicines at school was also found to vary by health condition, with 50% of children taking ADHD medicines reporting problems, and with lesser percentages of problems in children with asthma (25%) and diabetes (15.3%).

Nonadherence to medication treatment regimens may potentially lead to a variety of consequences at school for children with chronic health conditions. The results of this study suggest that missing medicines at school occurs (Table 3), although these findings reveal fewer missed medications than earlier studies. Children with asthma and diabetes were more likely to report never missing their medicines at school, while 12.1% of participants with ADHD indi-

cated they did not take their medication at school once a week.

Just over one third of children in the study thought that missing doses affected their schoolwork. More specifically, results indicate the impact of missing medication on children with ADHD appeared to have a greater effect on schoolwork and friendships compared with the other two groups, while the physical consequences appeared to vary widely based on health condition. The effects on schoolwork were found to be most prominent among children with ADHD, evidenced by reports from 39.4% of participants in this group that missing medicines at school made it difficult to pay attention. All children with ADHD reported some effect on schoolwork as a result of problems with their medication, whereas approximately 30% of children with asthma and diabetes each reported that missing doses at school produced no effect in them. These results are consistent with other research on parent concerns regarding health care provision to children with chronic illness in the schools (Notaras et al., 2002).

The treatment regimen for ADHD involves less personal control in the administration process as indicated by a higher incidence of receiving cues and reminders about taking medicine as well as administration of medication and supervision by another individual. For children with asthma, responses seem to reflect more control by the children in managing their medicines resulting in fewer errors or nonadherence. This is evidenced by their tendency to keep the medicine in their own bags and self-administer the medication when needed. Similarly, participants with diabetes appear to have greater control over managing their treatment regimen at school with better success. Perhaps children with diabetes should be given more responsibility, as appropriate, once they demonstrate the capacity to recognize the need to take their medication and competence in self-administering their medication.

These results are consistent with the few other studies suggesting that medication administration is a significant issue facing schools, families, and health care providers that requires systematic collaboration to address. Reutzell, Patel, and Myers (2001) reviewed 95% of the literature identified through a thorough search process and concluded that a set of core medication management guidelines are identifiable. More importantly, they found that pharmacists and school nurses must work effectively together to address these issues. Likewise, these authors suggest that pharmacists must play a central role in the solutions to these identified problems. However, in a follow-up study of 499 pharmacy faculty members, Reutzell and Watkins (2006) found that only 6.6% addressed the topic of medication management in schools in their curriculum. Likewise, only 2.6% conducted any research on this topic, and only 6% were involved in service in this area.

More systematic interdisciplinary research, teaching, and clinical efforts are necessary to address the growing national problem of medication administration in today's underfunded schools.

Limitations

Several limitations must be considered when interpreting the results of this study. The data in this study are all self-report, which are prone to responder bias. The researchers attempted to minimize bias by collecting data from both children and their parents. All participants were served in one large, university-based hospital. This facility serves a geographically and socioeconomically diverse population, but unique characteristics of the care provided in this center may make these findings less generalizable. Future research should examine these trends across multiple medical centers. Our study did, however, examine these issues across many school districts. Ideally, more objective data on medication administration errors and non-adherence are more desirable but are very difficult to collect without influencing the behaviors under observation.

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IMPLICATIONS FOR SCHOOL NURSE PRACTICE

One of the most common nursing interventions provided by school nurses is administration of medications to students (Pavelka, McCarthy, & Denehy, 1999). The results of this study, along with the findings from studies of school nurses and educators experiences with medications, indicate an ongoing need for school nurses to participate in supervising medication administration. As is clear from this study, the most common medication error in schools is a missed dose. School nurses need to educate school personnel who administer medications about the importance of students not missing a prescribed dose of medication and the appropriate reporting format and consequences if this does occur. In addition, school nurses may want to partner with parents of children with ADHD and other health care providers to encourage the use of medications that are administered once a day at home before attending school. This simple act can decrease the number of missed doses and errors described by these students and ultimately improve stu-

dent success. Students with asthma and diabetes are increasingly self-managing at least some aspects of their medication use, yet need ongoing teaching and monitoring of their self-management skills. School nurses need to identify who is responsible for the medication education of self-managing students and what the criteria are for deciding a child is capable of self-administration at school. Other issues to address are storage of the child's medication and availability of emergency back-up medication for the child. School nurses working in collaboration with students, parents, teachers, and other health care providers can provide the critical expertise and supervision to assure the safe administration of medications to students with these chronic conditions.

School nurses working in collaboration with students, parents, teachers, and other health care providers can provide the critical expertise and supervision to assure the safe administration of medications to students with these chronic conditions.

CONCLUSION

This study examined the types of medication problems children and their parents perceive occurring in school, along with risk factors for medication errors occurring and the consequences of these errors. Children with diabetes, asthma, and ADHD, and their parents, reported that missing a dose of medication and running out of medication were the most common problems they encountered, particularly for the children with ADHD. Missed doses of medication can lead to educational, social/emotional, and physical consequences for these children. School nurses will want to provide interventions to decrease the occurrence of these types of errors. Interestingly, students with more responsibility for their own medication management reported fewer medication errors. This is a positive finding in light of recent support for students with asthma and diabetes to be more involved in self-management, such as carrying their inhalers. More research is needed on best practices for supervising medication administration in schools, teaching children to self-manage their medications, and outcomes of self-management.

Acknowledgment. This research was supported by a grant from the Obermann Center for Advanced Studies Spelman Rockefeller Grant, The University of Iowa, Iowa City, IA.

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